



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

March 3, 1987

Docket No. 50-416  
LICENSEE: System Energy Resources, Inc. (SERI)  
FACILITY: Grand Gulf Nuclear Station, Unit 1  
SUBJECT: SUMMARY OF FEBRUARY 11, 1987 MEETING  
REGARDING CONTAINMENT PURGING

The purpose of the meeting was to discuss a program for obtaining operational data regarding containment purging. SERI participants were J. G. Cesare, J. Fowler and L. Robertson. NRC participants were J. Kudrick, P. Hearn, J. Unda and L. Kintner. Enclosure 1 is a handout prepared by SERI.

The present limits in the Technical Specifications on purging during plant operation (continuous purge through the 6-inch line and 1000 hours per year through the 20-inch line) were based on General Electric Company analyses of reactor coolant activity and leakage. In accord with License Condition 2.C.16, SERI provided a report dated October 3, 1986, based on data gathered during the first fuel cycle. SERI recommended in the report that the present limits on purging be continued.

Based on its review of the report, the staff expressed two concerns: (1) that the purge system should not be used for temperature and humidity control; and (2) that the data provided in the report was not adequate to justify the present purge limits. The information presented in this meeting was in response to these concerns.

The licensee described the need for routine, periodic access to the Mark III containment because many reactor support systems are located inside containment and maintenance and surveillance requires entries every day. Sheet 2 of the Enclosure shows typical systems and access requirements. Sheets 4 through 6 show the design of the Mark III containment and the purge system and present criteria for its operation. The system is not relied on for temperature or humidity control. The system includes recirculation of 3000 CFM through a charcoal filter train. Containment purge isolation valves are required by Technical Specifications to close in four seconds and are designed to close against LOCA pressures.

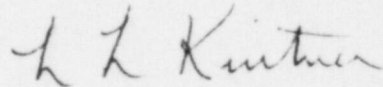
The staff questioned whether surveillance and maintenance activities were coordinated to achieve minimum access time in containment. The licensee stated that some surveillances are required once a day (e.g. reactor water samples and standby liquid control system concentration). Because of the large containment volume, the large purge system requires two days to make one air change. Therefore, if cleanup were needed for access, continuous purge may be needed. The air recirculation filter system is run continuously. During the first fuel cycle, radioactivity in the containment air was small (about 1% of the 10 CFP

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Part 20 maximum permissible concentration (MPC) at the end of the first fuel cycle). Presently, the containment air is about 8% MPC. The need for a continuous purge for access has not been demonstrated in the first fuel cycle. From ALARA considerations, 25% MPC is selected as a reasonable limit for access.

The licensee proposed a program to obtain additional data regarding the need to purge during the second fuel cycle (See Sheets 7 and 8 of Enclosure 1). To resolve the concern that purging not be used to control temperature and humidity, the licensee proposed a 30 day test in which the purge system would be isolated. Parameters to be measured would include temperature, relative humidity, pressure and air radioactivity. If radioactivity reaches 25% MPC, purging for access would be initiated. The test is planned to be run in February and March. To resolve the concern for adequate data regarding need for access, containment access will be monitored (individual's name, discipline, and time spent in containment) during the second fuel cycle. The security computer monitoring program has been modified to obtain needed data. The purge systems will be isolated unless containment air radioactivity reaches 25% MPC.

SERI will send NRC a letter within a few weeks summarizing the test monitoring program described in this meeting and provide a commitment to document the methodology used to determine the annual purging time limits for Grand Gulf after the second fuel cycle.



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NRC - SERI MEETING: CONTAINMENT PURGE  
BETHESDA, MARYLAND  
FEBRUARY 11, 1987

MEETING AGENDA

- |  |                                  |
|--|----------------------------------|
| I. INTRODUCTION  | J. G. CESARE                     |
| II. OVERVIEW OF THE MARK III CONTAINMENT<br>ACCESS REQUIREMENTS              | J. L. ROBERTSON                  |
| III. DESIGN OF THE CONTAINMENT PURGE   | J. L. ROBERTSON/<br>J. O. FOWLER |
| IV. NRC CONCERNS REGARDING THE ADEQUACY OF<br>THE CONTAINMENT COOLING SYSTEM | J. O. FOWLER                     |
| V. CYCLE 2 MONITORING PROGRAM/USE OF PURGE                                   | J. G. CESARE                     |
| VI. SUMMARY/CONCLUSION REMARKS   | J. G. CESARE                     |

## MARK III CONTAINMENT ACCESS REQUIREMENTS

- O COMPARISON OF THE MARK II AND MARK III CONTAINMENT DESIGNS
  - MARK II CONTAINMENT ROUGHLY EQUIVALENT IN SIZE TO THE MARK III DRYWELL
  - MARK III CONTAINMENT DESIGN ALLOWS MORE REACTOR SUPPORT SYSTEMS TO BE LOCATED INSIDE CONTAINMENT THEREFORE REQUIRING ACCESS DURING POWER OPERATION
- O TYPICAL EQUIPMENT/SYSTEMS LOCATED INSIDE THE MARK III CONTAINMENT
  - REACTOR WATER CLEANUP SYSTEM
  - REACTOR WATER SAMPLE PANEL
  - STANDBY LIQUID CONTROL
  - CRD HYDRAULIC CONTROL UNITS
  - RECIRC FLOW CONTROL VALVE HYDRAULIC POWER UNITS
  - REACTOR VESSEL & DRYWELL INSTRUMENTATION RACKS
  - UPPER CONTAINMENT POOLS
  - TRANSVERSING INCORE PROBE SYSTEM
  - ISOLATION VALVES CONSIDERED ACCESSIBLE
- O TYPICAL ACCESS REQUIREMENTS BASED ON EARLY CYCLE 2 DATA (1/6/87 - 1/31/87)
  - OPERATIONS - 41 MAN HOURS/WEEK
  - MAINTENANCE - 73 MAN HOURS/WEEK
  - HEALTH PHYSICS - 47 MAN HOURS/WEEK
  - CHEMISTRY - 12 MAN HOURS/WEEK
  - THE ABOVE ACTIVITIES REPRESENT THE MAJORITY (94%) OF IN-CONTAINMENT WORK WHILE AT POWER.

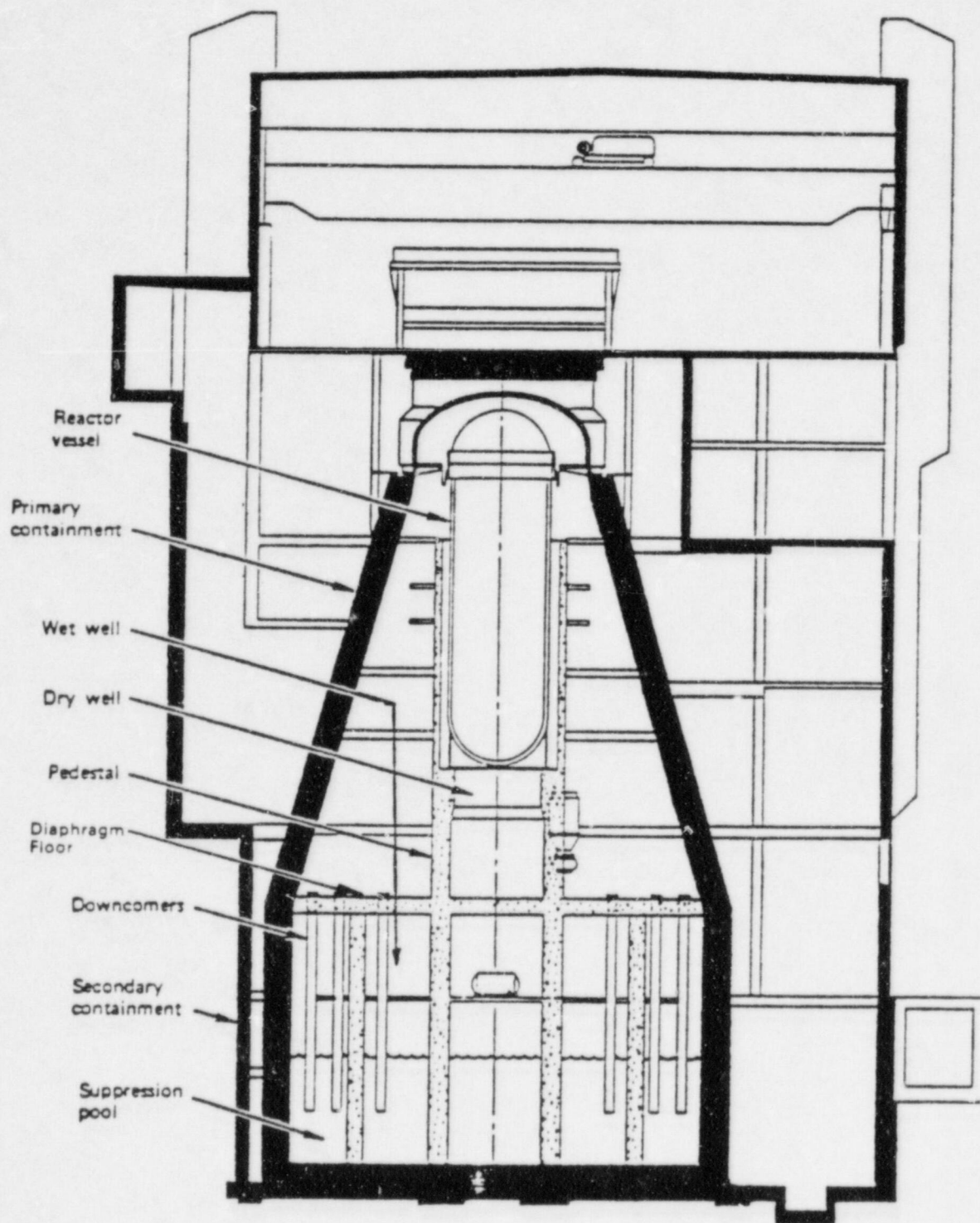


Figure 3. BWR Mark II containment.

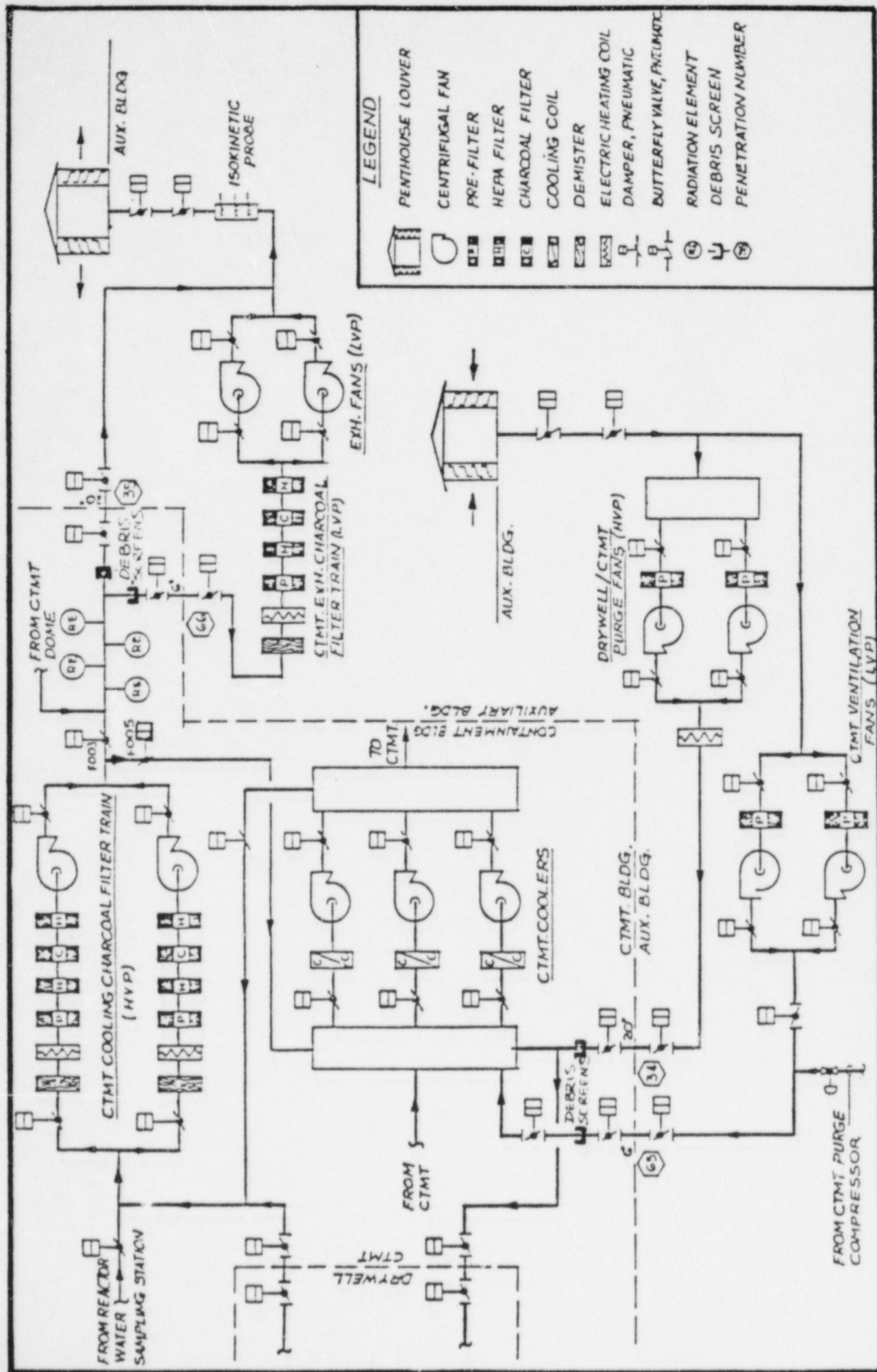




## DESIGN OF THE CONTAINMENT PURGE

- 0 DESCRIPTION OF THE LOW VOLUME AND HIGH VOLUME PURGE
- 0 COMPLIANCE WITH THE POSITIONS OF BTP 6-4
  - ISOLATION VALVES HAVE BEEN SHOWN TO FUNCTION PROPERLY AGAINST LOCA PRESSURES. CLOSURE TIMES ARE REQUIRED BY TECH SPECS TO BE LESS THAN 4 SECONDS. TESTING OF THE ISOLATION VALVES IS COVERED UNDER THE ISI PROGRAM.
  - THE NUMBER OF SUPPLY AND EXHAUST LINES ARE LIMITED TO ONE SUPPLY LINE AND ONE EXHAUST LINE FOR EACH PURGE SUBSYSTEM. TECH SPECS PROHIBIT USE OF BOTH THE HVP AND THE LVP AT THE SAME TIME.
  - THE LVP NOMINAL LINE SIZE IS 6 INCHES. THE HVP NOMINAL LINE SIZE IS 20 INCHES, HOWEVER, USE OF THE HVP IS LIMITED TO 1000 HOURS PER YEAR WHILE IN OPERATIONAL CONDITIONS 1, 2 AND 3.
  - THE PURGE PENETRATIONS MEET GDC 54 AND 56 FOR LINES PENETRATING CONTAINMENT.
  - PURGE LINES HAVE REDUNDANT ISOLATION VALVES WHICH ISOLATE ON LOCA SIGNALS. OUTBOARD AND INBOARD VALVES ARE POWERED BY SEPARATE DIVISIONS.
  - ISOLATION VALVES ARE TESTED PERIODICALLY IN ACCORDANCE WITH TECH SPECS.
  - SEISMIC CATEGORY I SCREENS ARE PROVIDED FOR BOTH THE INLET AND EXHAUST VALVES TO PREVENT DEBRIS FROM EFFECTING VALVE CLOSURE UNDER POSTULATED ACCIDENT CONDITIONS.
  - NOT RELIED ON TO CONTROL TEMPERATURE AND HUMIDITY.
  - PROVISIONS FOR ATMOSPHERE CLEANUP ARE PROVIDED BY THE CONTAINMENT FILTRATION SUBSYSTEM.
  - ISOLATION FUNCTION IS DEMONSTRATED ONCE PER 18 MONTHS AND LEAK RATE TESTED ONCE PER 92 DAYS.
  - ANALYSIS HAS BEEN PERFORMED ON THE CONSEQUENCES OF A LOCA WHILE PURGING THE CONTAINMENT ATMOSPHERE. THE RADIOLOGICAL CONSEQUENCES ARE WITHIN THE 10CFR100 GUIDELINES.





"Simplified Composite Drawing of the Containment Ventilation and Filtration System"

NPC CONCERNS REGARDING THE ADEQUACY OF  
THE CONTAINMENT COOLING SYSTEM

- O STATEMENT OF THE CONCERN
- O SPECIAL TEST WILL CONFIRM THE ADEQUACY OF THE CONTAINMENT COOLING SYSTEM
- O DESCRIPTION OF THE SPECIAL TEST WITH PURGE ISOLATED
  - PARAMETERS TO BE MONITORED
    - TEMPERATURE
    - RELATIVE HUMIDITY
    - CONTAINMENT PRESSURE
    - OXYGEN LEVEL
    - EXPLOSIVE GASES
    - PARTICULATE ISOTOPES
    - GASEOUS ISOTOPES
  - TEST DURATION OF AT LEAST 30 DAYS
  - ACCESS WILL BE MONITORED IN ACCORDANCE WITH THE CYCLE 2 CONTAINMENT PURGE MONITORING PROGRAM
- O DURING THE TEST, KEY AIR QUALITY PARAMETERS WILL BE EVALUATED TO ASSURE NO HAZARDS TO PERSONNEL ENTERING THE CONTAINMENT. THE PURGE MAY BE INITIATED AT ANY TIME THAT AIR QUALITY APPROACHES PRE-SPECIFIED LIMITS.
- O A REPORT OF THE TEST RESULTS WILL BE SUBMITTED WITHIN 60 DAYS OF COMPLETION OF THE TEST. THE TEST REPORT WILL ADDRESS:
  - TEMPERATURE AND RELATIVE HUMIDITY TRENDS DURING THE TEST PERIOD
  - USE OF THE LVP DURING THE TEST PERIOD (IF REQUIRED)
  - ADJUSTMENTS TO THE CYCLE 2 CONTAINMENT PURGE MONITORING PROGRAM (IF REQUIRED)
- O SCHEDULE FOR TEST

## CYCLE 2 CONTAINMENT PURGE MONITORING PROGRAM/USE OF PURGE

### O PURPOSE OF THE PROGRAM

- GATHER DATA TO EVALUATE THE LONG TERM NEED FOR CONTAINMENT PURGE DURING OPERATION

### O MONITORED AIR QUALITY PARAMETERS

- OXYGEN
- EXPLOSIVE LIMITS
- PARTICULATE ISOTOPES
- GASEOUS ISOTOPES

### O CRITERIA FOR THE USE OF THE PURGE DURING OPERATION

- LVP WILL BE USED ONLY TO MAINTAIN AIR QUALITY WITHIN ESTABLISHED GUIDELINES.

O USE BASED ON THRESHOLDS

O SPECIAL CONDITIONS (EXPECTED TO BE RARE)

- HVP WILL BE CONTROLLED IN ACCORDANCE WITH TECH SPECS.

### O IMPROVED CONTAINMENT ACCESS MONITORING PROGRAM

- SECURITY SOFTWARE MODIFICATIONS ARE NOW COMPLETE
- ACCESS TO CONTAINMENT IS MONITORED CONTINUOUSLY - RECORDS ARE MAINTAINED AS TO INDIVIDUALS NAME, DISCIPLINE AND TIME SPENT IN CONTAINMENT.
- SAMPLE PRINTOUT OF CONTAINMENT ACCESS REPORT

### O REPORT WILL BE SUBMITTED PRIOR TO RESTART FROM RF02.

- DETAIL OF CYCLE 2 DATA
- RECOMMENDATIONS FOR USE OF LVP FOR CYCLE 3



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/s/

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